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ABSTRACT

The purpose of this paper was to analyze the initial results of statewide implementation of the PRIME TIME program in Indiana. PRIME TIME is a state-wide program to reduce class size in the primary grades. Mean scores from 65,911 third graders who had completed the Indiana Competency Test in the spring of 1987 after completing 3 years of the program were compared with the scores of 67,987 third graders who had no experience with the program. A difference of only 0.7 points favoring the smaller classes was found on the composite scores of four subtests, suggesting that monetary expenditures for PRIME TIME were not justified by program effects. A test of homogeneity of variance was also performed. Results indicated that the smaller classes caused both high and low scores to regress to the mean. It is concluded that, since smaller classes cost a tremendous amount of money, it is the responsibility of educators to learn when and where reductions of class size are most beneficial to students. (Author/RH)

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The Cumulative Effects of Indiana PRIME TIME, A State Sponsored Reduced Class Size Program, On Basic Skills Achievement

by
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ABSTRACT

The purpose of this paper was to analyze the initial results of statewide implementation of the PRIME TIME program in Indiana. PRIME TIME is a state-wide program to reduce class size in the primary grades in elementary schools. Mean scores from 65,911 third graders who had completed the Indiana Competency Test in the Spring of 1987 after completing three years of the PRIME TIME program were compared with the scores of 67,987 third graders who had experienced no PRIME TIME classes. There was a difference of 0.7 points on the composite scores of four subtests favoring the smaller classes. However, this difference has no practical utility since any difference would have been significant where there were over 133,000 subjects. A test of homogeneity of variance was also performed. Results indicated that the effect of smaller classes was to cause both high and low scores to regress to the mean.

Background of the Problem

The issue of optimum class size in public schools has been a topic filled with controversy. Passionate arguments have been presented both in favor of, and opposed to, the reduction in class size from present levels. This controversy is filled with complicating factors, such as teaching style, subject taught, age of student, socioeconomic status of the student, an a plethora of other factors. It is very difficult to find a definitive statement in the literature regarding optimum class size and these are as many opponents as proponents of class size reduction.

The theoretical rationale behind the movement to reduce class size included the following factors. First, by virtue of having smaller classes, teachers would be able to give students more individualized attention. Second, teacher morale would be improved, due in part to the resulting decrease in paperwork. Third, with smaller classes it was assumed that discipline problems would decrease and the whole educative process would be more effective.

The origin of the controversy was the meta-analysis on class size research done in 1978 by Glass and Smith (1979). Using the relatively new technique of meta-analysis, Glass and Smith concluded that a strong relationship existed between class size and achievement. The authors included a graph in their report which illustrated this relationship as follows:

> A typical pupil in a typical class of 40 students scores at the 50th percentile of an achievement test. If this pupil had been taught in a group of 30 pupils, his achievement would have tested out at about the same level. But taught in a group of 20, the pupil would score at the 55th percentile. His achievement would rise to the 60th percentile if he were taught in a group of 15, and the 75th percentile if he were taught in a group of five (Glass & Down, 1979, p.22).

This meta-analysis seemed to confirm what teachers had long felt. Silberman (1978) noted "When I was a teacher, my colleagues and I all

knew that small classes were essential" (p.38). It seemed that Glass and Smith had validated this long held "gut" reaction of teachers.

However, the meta-analysis was not without its critics. In 1980, the Educational Research Service (ERS) published a critique of Glass and Smith's work. In this critique, the ERS pointed out the flaws of the meta-analysis. In summary, these flaws included: (a) over-generalization of conclusions, (b) reliance on only a few studies, (c) inconsistent methodology, (d) contradicting interpretations, and (e) the loss of meaningful clues via combining "statistically diverse data dealing with such critical variables as pupil ability, subject taught, and grade level" (p. 241).

Based upon the discussion of these flaws, the ERS stated that its original conclusions were unchanged by the results of the meta-analysis. The ERS reported that "within a mid-range of about 25-34 pupils, class size seems to have little if any decisive impact...smaller classes can have a positive influence on pupil achievement in reading and mathematics in the primary grades for low-achieving and economically or socially disadvantaged students...Few pupil benefits can be expected from reducing class size if teachers continue to use the same teaching techniques that they used in larger classes" (p. 241).

The ERS was not the only critic of Glass and Smith's work. Cacha (1982) raised several questions about the meta-analysis method employed by Glass and Smith. In addition to being critical of the small number of studies used in the actual meta-analysis, Cacha noted that the sophisticated methods of data analysis caused a "homogenization" of the data which resulted in the "bold generalizations" made by Glass and Smith.

It seemed clear at this point that an actual test of the class size issue was needed. Two states, Indiana and Tennessee, are currently involved in such tests.

The pilot project conducted in Indiana (Indiana State Department of Public Instruction, 1983) yielded promising results for the program labeled PRIME TIME. This pilot program was two years in length and included 24 K-2 classes in nine schools. Three major results of the PRIME TIME pilot project were noted. These were: "(1) students in the project scored higher on standardized tests than did students in larger classes; (2) discipline and behavior problems were reduced

in classes with lower teacher/student ratios; and (3) teachers reported increased productivity and effectiveness in classes with fewer students" (pp. 3-4). Despite the fact that the report authors stated that the results "should not be considered definitive research due to many limitations inherent in evaluating the project" (pp. 4-5), the changes in test scores were called "real evidence" in favor of small classes (p. 10).

Based upon the results of the pilot project, Governor Orr and Superintendent of Public Instruction Negley urged that PRIME TIME be instituted statewide. Sava (1984) described the details of the implementation of PRIME TIME. He noted that Indiana had passed legislation to spend $150-180 million to fully implement the program. The state payed each school corporation $18,000 for each teacher hired to teach classes of "18 students or fewer in grades K-3" (p. 64). In addition, corporations received $6,000 for certified teacher aides and a $3,600 bonus to those corporations which already had the 18-1 ratio in effect.

In Tennessee the class size issue is receiving more detailed study. Bain and Achilles (1986) focused on the reforms being implemented via the Comprehensive Education Reform Act (CERA) enacted in 1984. Among the several facets of the program are: the provision of college tutors for inner-city high school students; a needs assessment of educationally and economically disadvantaged students; and a study of the effects of a 15-1 student/teacher ratio in grades 1-3. This last project involved the use of blind control groups who are matched to the experimental subjects on sex, race, birthdate, total prereading score, and economic status. The researchers in Tennessee are also studying "teacher variables [such] as attitudes and use of time" (p. 664). In 1985 a new segment was added to the Tennessee project. The same group of students were to be followed for four years and the outcomes of three types of classes compared: small classes (13-17 students); regular classes (22-25 students) with an aide; and regular classes without an aide. In addition, the researchers added to the study an assessment of several student variables, background experience of teachers and aides, the instructional methods used, and teacher morale and attendance. Clearly the Tennessee study is less simplistic than the comparisons that were made in Indiana.

Bain, Achilles, Caraher, and Whittington (1986) reported some preliminary results from the Tennessee project. Areas in which the 15-1 group of first graders performed more favorably than their matched counterparts were achievement, behavior, teacher perceptions, and teacher comments about instruction and classroom activity. Further results from Tennessee should be helpful to those educators attempting to sort out th many variables involved in the class size controversy.

Based on the Glass and Smith meta-analysis and the tentative results in Indiana and Tennessee, reduced class size would seem to be a promising solution in the attempt to increase educational effectiveness. Large scale, longitudinal studies are needed to clarify the actual outcomes of reduced class size. It seems reasonable to hypothesize that if students learn more in small classes, mean scores on achievement tests should be higher than scores obtained by students in larger classes. Furthermore, if small class size is effective in remedying problems, there should be less variation in test scores for students who have experienced three years of PRIME TIME as compared with that of students with no PRIME TIME instruction.

Statement of the Problem

Teachers today are experiencing many attacks on the efficacy of the service that they provide to students. Breinin (1987), Glickman (1987), and Stedman (1987) are but a few of the authors writing about the complexities involved in 1980s-style education. A legitimate question then is "How can teachers help students learn basic skills more effectively?" For the purpose of this study a more specific question is 'Do children in smaller classes learn basic skills more effectively than children in larger classes?" Two hypotheses were tested:

(1) Mean statewide IBCST composite scores will be higher for those students who have been in PRIME TIME classes for three years than for those students in regular classes; and

(2) The variation in scores for the PRIME TIME group will be less than the variation in scores in the regular class size group.

Methodology

This study used in 1986 1987 reports on the results of the Indiana Basic Competency Skills Test (IBCST) for the data base. These reports were generated by the Center for School Assessment, Indiana Department of Public Instruction. For this study, all of the test scores from the state were contained in data analyzed and were, in essence, those of the entire population of third graders in Indiana.

Two groups were compared. Third graders in 1986 received no PRIME TIME instruction. Third graders in 1987 were enrolled in classes which had experienced three years of the statewide PRIME TIME program and were therefore the "experimental" group. Both groups were tested with the IBCST and mean composite scores were compared.

This study used a cohort design. Because the data were for the entire population of over 133,000 third graders any differences would be of statistical significance but a small difference would not be of practical significance. In addition, an F test for homogeneity of variance was performed. Tests were first conducted at the .05 level and .01 level.

Results

The means of the scores for the two comparison groups are contained in Table 1.

Insert Table One

The results of the scores of the four subtests that were included in the composite scores only yielded a 0.7 point difference between the two groups.

Because the distribution of composite scores "looked" different in 1987 than 1986, a test for homogeneity of variance was used. An F value of 1.138 was obtained, which was significant at the .01 level.

Insert Table Two

Discussion, Conclusions, & Recommendations

From the comparison of the means of the composite scores for

the two groups, there was a 0.7 point difference on the composite score of four subtests. The meaning of this difference has little practical significance. Therefore, the first (directional) hypothesis could not be confirmed; that is, the PRIME TIME classes did not have a higher mean score than the non-PRIME TIME classes. Since a difference of less than one point was shown, it is doubtful that the monetary expenditures for PRIME TIME justified such a marginal gain. Given the number of students tested, alomst any gain would have been shown to be "significant."

Furthermore, the 0.7 of one point gain represents not just the contribution of PRIME TIME, but also contains the contribution of all of the educational improvement programs in Indiana that influenced third grade students at that time. The test for homogeneity of variance revealed that the variation in scores for 1986 was greater than for 1987 (PRIME TIME classes). This resulted in a rejection of the second (null) hypothesis. The difference in population variance could have been an indication that PRIME TIME had the effect of causing scores to regress to the mean.

The results of this large scale comparison of PRIME TIME and regular classes suggest that the long term effects of a state sponsored reduced class size program are negligible. The benefits of research such as that conducted in Tennessee were clearer. Given the strict controls used in the Tennessee study, it was hoped that the results in that state would be more definitive than those in Indiana. It was possible that reduced class size did have a favorable impact upon achievement in some student populations, but the Indiana results were too minor and the program too poorly controlled to determine the exact impact of PRIME TIME. More investigation will be necessary to determine the long term effects of class size reduction.

In conclusion, C.D. Glickman (1987) noted in a recent Phi Delta Kappan that school reform is replete with ambiguity. He stated that in a study of three different improving school districts, no common approach to change was seen. Successful teaching was an area in which no absolutes were present. Each "success" was context - and classroom-specific. Glickman concluded by saying that "instructional improvement is a constant cycle of decisions, discoveries, and further

decisions, as we explore the unknown. In accepting uncertainty, we unlock school reform and enter a new phase of professionalism" (p. 122). Glickman's point seemed especially pertinent to the issue of reduced class size. Smaller classes cost a tremendous amount of money and it is the responsibility of educators to learn when and where these class reductions are of the most benefit to the students served.

TABLE ONE

IBCST Mean Scores

3rd Grade

		Reading	Math	Writing	Composite
1986	$\bar{x}$	56.8	35.0	29.2	118.0
	s				14.99
	n	65911	65870	65756	65466
1987	$\bar{x}$	57.9	36.0	28.2	118.7
	s				14.05
	n	67973	67987	67846	67700

Z = 9.09 when composite means of 118.7 and 118 were compared
(Significant at the .01 level)

TABLE TWO

Partial Distribution of Scores

1986	Scores greater than 133 = 3816/65466 Scores between 118 and 132 = 38837/65466
1987	Scores greater than 133 = 2218/67700 Scores between 119 and 132 = 41549/67700

F value for homogeneity of variance = 1.138
(Significant at the .01 level)

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